5.1.3 Instituting a Nuclear Safety Research Function

Issue

DOE should establish an integrated corporate program for assessing, prioritizing, integrating and managing applicable nuclear safety research (including analysis, testing, and development).

Basis

To improve Federal safety assurance, a strong nuclear safety research program is necessary. Currently, nuclear safety research decisions are made either by program offices based on perceived need, or by established groups that are also authorized to make decisions. While program office decisions of need may be coordinated with other offices, particularly if additional funding is needed, there is no requirement to seek collaboration or participation. The current nuclear safety research program is fragmented and not consistently prioritized relative to the need.

Resolution Approach

DOE nuclear operations demand a high level of safety and attention to detail, particularly for operations involving high consequence, low probability accidents. These operations also demand rigorous research and development. An integrated nuclear safety research program will preserve key needs, better integrate research development, and provide critical information to enhance decision-making. This effort also needs to ensure that when nuclear safety issues arise, the proper research response is designed, authorized and carried out, without duplicating normal programmatic research that enhances efficiency or effectiveness of processes and technologies. The objectives of the nuclear safety research program will include:

- Maintaining nuclear safety core capability for the Department,
- Advancing the fundamental understanding of nuclear safety science and technology,
- Coordinating nuclear safety research across the Department,
- Advancing the information needed to develop technical directives,
- Developing and maintaining technically competent safety professionals, and
- Providing generic support for nuclear weapons activities, nuclear energy programs, nuclear materials activities, and nuclear waste programs.

Completed Actions. The Secretary formally established that the Assistant Secretary for Environment, Safety and Health (EH) has primary responsibility for the nuclear safety research function. The Secretary formally assigned the following roles and responsibilities to the Assistant Secretary for EH:

- Establish the Office of Nuclear Safety Research;
- Develop, prioritize and approve an annual nuclear safety research plan that meets the needs of the DOE ESE CTA and the NNSA CTA and that takes into account information obtained through the operating experience program;

- Implement the annual nuclear safety research plan;
- Identify changes in DOE directives and standards, when appropriate, based on nuclear safety research results;
- Maintain adequate numbers of technically competent personnel necessary to fulfill nuclear safety research responsibilities within the Office of Nuclear Safety Research; and
- Participate in and represent DOE at national and international nuclear safety research organizations and their activities.

The Assistant Secretary for Environment, Safety and Health has:

- Assigned the Office of Nuclear Safety Research to the Office of Corporate Performance Assessment (EH-3);
- Completed the initial staffing of the Office of Nuclear Safety Research, including assignment of an Acting Responsible Manager.
- Defined the funding needs for the Office by preparing, submitting, and approving funding needs.
- Initiated interagency information exchange activities on nuclear safety research.

General Approach. The EH Office of Nuclear Safety Research will use the basic framework indicated below in carrying out its duties:

- Identify potential nuclear safety research needs.
- Evaluate and prioritize potential nuclear safety research needs.
- Select nuclear safety research projects for funding.
- Manage nuclear safety research projects.
- Disseminate nuclear safety research findings.

Identify potential nuclear safety research needs. The DOE Office of Nuclear Safety Research will identify research needs for nuclear safety design, analysis, testing, construction, and operation through several continuous processes, including: (1) EH's performance assessment trending of operating experience and authorization bases issues, and (2) aggressive solicitation of research needs from the CTAs and their staffs, line and field organizations, and contractor groups, such as EFCOG (Energy Facilities Contractors Group) and NLIC (National Laboratory Improvement Council). The Office of Nuclear Safety Research will conduct periodic meetings with these organizations to proactively request potential issues for research study, to discuss safety trends that could lead to the need for safety research, and to review the results of DOE analyses that indicate the potential need for additional nuclear safety research. The Office will also evaluate opportunities for improvement in the Department's directives and standards systems, and pursue potential improvements that may be possible with increased knowledge and understanding.

To help in identifying potentially beneficial research and to avoid redundant work, the DOE Office of Nuclear Safety Research will also maintain awareness of nuclear safety research being conducted by DOE line organizations. The Office will integrate potential needs identified with the safety research already occurring across the complex to maximize research benefits. In addition, the

Office will actively interface with the NRC, INPO, and other organizations of the commercial and international nuclear industry to obtain research results and information useful to DOE's nuclear safety interests.

Evaluate and prioritize potential nuclear safety research needs. The Office of Nuclear Safety Research will develop informational scoping packages for each identified safety research issue/need/problem. Each informational package will fully describe: the safety issue/problem to be studied; the possible research envisioned to address the issue; the expected schedule to complete the task, the expected cost to perform the research task; and, the expected benefit to DOE for conducting the research and resolving the safety issue.

Each fall, the Office of Nuclear Safety Research will formally present the informational scoping packages to the EH Deputy Assistant Secretary for Corporate Performance Assessment (EH-3). EH-3 will evaluate the informational packages and will establish the priority for these potential research requests. The Office of Nuclear Safety Research will then take the priority rankings and will develop the annual nuclear safety research plan. This annual research plan will be reviewed and approved by the Assistant Secretary for Environment, Safety and Health.

Select nuclear safety research projects for funding. The Office of Nuclear Safety Research has the primary responsibility for an annual nuclear safety research plan, through which research projects will be developed, prioritized, and funded. The Assistant Secretary for the Office of Environment, Safety and Heath will approve this plan, with concurrence from DOE ESE and NNSA CTAs. The Office of Nuclear Safety Research will fund specific nuclear safety research projects/efforts based on the approved plan.

Manage nuclear safety research projects. The Office of Nuclear Safety Research will actively manage nuclear safety research projects that it funds to ensure they are conducted on schedule and as designed. The Office will monitor and evaluate research performance to ensure that research funding is being well spent.

Disseminate nuclear safety research findings. The Office of Nuclear Safety Research will disseminate nuclear safety research findings through a variety of mechanisms. For example, the Office will prepare and issue an annual nuclear safety research report for approval by the Assistant Secretary for Environment, Safety and Health. The Office will also identify any new directives or standards, or changes to directives and standards that may be indicated by research results.

The EH Office of Nuclear Safety Research plans to implement the following activities on its path toward full implementation:

- Establish and formalize Office processes for identifying, prioritizing, selecting, executing safety-related research and development;
- Describe the interfaces between the nuclear safety research program and other organizations (e.g., Program Secretarial Offices including the Office of Science, sites, CTAs); and
- Determine the Office technical staffing needs, interview candidates, hire staff, as necessary.

The nuclear safety research function will work with DOE line organizations and the CDNS and the ESE CENS on a continuous basis to determine the research needs for nuclear safety design, analysis, testing, construction, and operation. EH has been assigned the primary responsibility for this function which focuses on safety research in areas that need further attention such as risk management and fire safety. This does not preclude other organizations, such as EM and NNSA, from conducting research, as required, to meet their unique needs. EH will maintain cognizance of these activities.

To fully implement the nuclear safety research function, the Department has identified the following three key milestones:

1. The nuclear safety research function is formally established – the organizational placement of the function within EH is determined, the responsible leader (acting or permanent) has been named, and the roles and responsibilities have been broadly defined – The Secretary approved the roles and responsibilities in April 2005.

2. The nuclear safety research function has adequate processes and technical capabilities to perform – the key processes for identifying, prioritizing, and executing nuclear safety research are formally established and agreed-upon, and the key critical staff positions that support the function are established.

3. The nuclear safety research function is fully implemented – the nuclear safety research function has sufficient capability and resources (personnel, funding, etc.), has proven effective processes in operation describing how the function is implemented, has a demonstrated record of performance, and feedback is available on its impact.

The Office of Nuclear Safety Research will technically and programmatically lead each research project that it funds. This will include clearly defining the scope of each research project; developing schedules with intermediate milestones; and reviewing/verifying the research findings, including use of peer review where applicable.

Deliverables/Milestones

Commitment 6: Formally establish the nuclear safety research function (as described above).

Lead Responsibility:	Secretary of Energy
Deliverable:	Secretarial memo identifying the roles and responsibilities of the nuclear safety research function.
Due Date:	**Completed - April 26, 2005**

Commitment 7: Provide adequate processes and technical capabilities for the nuclear safety research function (as described above).

Lead Responsibility: EH-1

Deliverable A:	Letter report to the Secretary declaring that adequate processes are in place and agreed upon and providing the basis for this declaration.
Due Date A:	Six months after formally establishing the nuclear safety research function, per Commitment 6. [October 2005]
Deliverable B:	Letter report to the Secretary declaring that adequate technical capabilities are available and providing the basis for this declaration.
Due Date B:	Nine months after formally establishing the nuclear safety research function, per Commitment 6. [January 2006]

Commitment 8: Fully implement the nuclear safety research function (as described above).

Lead Responsibility: EH-1

Deliverable:	Letter report to the Secretary declaring the nuclear safety research function fully implemented and providing the basis for this declaration.
Due Date:	Twelve months after providing adequate processes and technical capabilities for the nuclear safety research function, per Commitment 7. [January 2007]

Integration with ISM system

This topic is clearly focused on improving consistency and completeness of implementation of ISM Guiding Principle #5 – Identification of Safety Standards and Requirements and Guiding Principle #6 – Hazard Controls Tailored to Work Being Performed. This principle permeates the performance of all ISM core functions at all levels. This topic is most clearly related to the ISM functions related to feedback and improvement through revised requirements and directives: #1 – Define Work Scope, and #5 – Feedback and Improvement. The actual research will often be focused on ISM core functions related to understanding hazards and developing controls: #2 – Identify Hazards, and #3 – Develop Hazard Controls.